

THE CLAIMS

1. (Original) An electric motor vehicle comprising:
a wheel containing a motor stator and a motor rotor;
an integrated structure fabricated from a unitary non-ferromagnetic substance, said
structure having a wheel axle portion and a motor stator mounting element portion, the stator
5 mounting element portion having a cylindrical configuration with its axis collinear with the axis
of the axle, the integrated structure comprising a central passage that extends along the axis of
the axle portion and the stator mounting element portion; and

wherein at least one ferromagnetic segment of the motor stator is joined directly to the
stator mounting element.

2. (Currently Amended) An electric motor vehicle as recited in claim [[1]] Z, wherein
the diameter of the cylindrical stator mounting element portion is greater than its length in the
direction of the axis and the axle portion comprises a section formed at each axial side of the
stator mounting element portion.

3. (Currently Amended) An electric motor vehicle as recited in claim [[1]] Z, wherein
the rotor comprises an annular ring configuration radially surrounding the stator and separated
therefrom by a radial air gap, and a rotor housing; and

the rotor housing is journaled to the axle portion via bearings.

4. (Original) An electric motor vehicle as recited in claim 3, wherein the wheel axle
portion extends on each axial side of the motor stator mounting element and bearings
circumscribe the axle portion on both sides of the motor stator mounting element.

5. (Original) An electric motor vehicle as recited in claim 3, wherein a wheel assembly is mounted on the rotor housing.

6. (Original) An electric motor vehicle as recited in claim 1, wherein the motor stator mounting element portion comprises cooling means in communication with said central passage for cooling the stator.

7. (Currently Amended) An electric motor vehicle [as recited in claim 6, wherein said cooling means] comprising:

a wheel containing a motor stator and a motor rotor;

an integrated structure fabricated from a unitary non-ferromagnetic substance, said

5 structure having a wheel axle portion and a motor stator mounting element portion, the stator mounting element portion having a cylindrical configuration with its axis collinear with the axis of the axle, the integrated structure comprising a central passage that extends along the axis of the axle portion and the stator mounting element portion; wherein

10 at least one ferromagnetic segment of the motor stator is joined directly to the stator mounting element;

the motor stator mounting element portion comprises cooling means in communication with said central passage for cooling the stator; and

said cooling means comprises:

15 a plurality of cavities, each cavity formed along an arc at a fixed radial distance from the axis and extending in a direction parallel to the axis from a first end to a second end; and
heat exchanger surfaces provided in the cavities.

8. (Original) An electric motor vehicle as recited in claim 7, wherein said central passage is hollow and contains a barrier to prevent flow of air directly along the entire passage, the barrier located in the central passage at a position intermediate the locations along the axis of the first and second ends of the cavities; and

5 said cooling means further comprises a channel at each end of each cavity extending in the radial direction from the respective cavity to an opening in the central passage;

 whereby incoming air from one end of the central passage is directed through inlet channels to the first ends of the cavities, through the cavities and heat exchanger surfaces to the second ends of the cavities, through the outlet channels at the second ends and into the central
10 passage.

9. (Currently Amended) An electric motor vehicle as recited in claim 1, further comprising at least one channel in a first of the wheel axle portion sections for providing wire access to the motor stator.

10. (Original) An electric motor vehicle as recited in claim 9, wherein the diameter of the first wheel axle portion section is greater than the diameter of the other wheel axle portion section.

11. (Currently Amended) An electric motor vehicle as recited in claim ~~[[1]]~~ 7, wherein the motor stator comprises a plurality of ferromagnetic-core segments ferromagnetically isolated from each other.

12. (New) An electric motor apparatus comprising:

 a hollow shaft having a central passage extending from a first end to a second end;

a stator support structure secured to said hollow shaft;

a plurality of electric motor stator elements secured to said stator support structure;

5 and

a rotor housing surrounding said stator support structure, said rotor housing having a plurality of permanent magnets secured thereto;

wherein said rotor housing is supported by said hollow shaft and said permanent magnets are separated from said stator elements by an air gap.

13. (New) An electric motor apparatus as recited in claim 12, wherein said stator support structure is formed from a unitary material.

14. (New) An electric motor apparatus as recited in claim 12, wherein said stator support structure is non-ferromagnetic.

15. (New) An electric motor apparatus as recited in claim 12, wherein said stator support structure has a cylindrical shape about a central axis.

16. (New) An electric motor apparatus as recited in claim 12, wherein said stator support structure axis is collinear with the axis of said hollow shaft.

17. (New) An electric motor apparatus as recited in claim 12, wherein the diameter of the cylindrically shaped stator support structure is greater than its length in the direction of the axis.

18. (New) An electric motor apparatus as recited in claim 12, wherein the first end of the hollow shaft has an outside diameter that is greater than the outside diameter at the second end.

19. (New) An electric motor apparatus as recited in claim 12, wherein said hollow shaft comprises a cavity that extends in a radial direction from the central passage to said stator support structure.

20. (New) An electric motor apparatus as recited in claim 19, wherein at least one heat exchanger is in thermal communication with said cavity.

21. (New) An electric motor apparatus as recited in claim 20, wherein incoming coolant from one end of said central passage is directed through said cavity past said heat exchangers to the other end of said central passage.

22. (New) An electric motor apparatus as recited in claim 19, wherein said cavity is in thermal communication with said air gap that separates said permanent magnets from said stator elements.

23. (New) An electric motor apparatus as recited in claim 22, wherein said hollow shaft comprises a plurality of cable apertures.

24. (New) The An electric motor apparatus as recited in 23, wherein said cable apertures extend through said stator support structure to allow at least one cable to extend from said stator element to a position external to said hollow shaft.

25. (New) An electric motor apparatus as recited in claim 12, further comprising a cavity in an interior portion of the stator support structure that extends in a direction parallel to the axis from a first location to a second location, a passage extending in the radial direction from each of said first and second cavity locations to the central passage of the
5 hollow shaft.

26. (New) An electric motor apparatus as recited in claim 25, wherein at least one heat exchanger is in thermal communication with said cavity.

27. (New) An electric motor apparatus as recited in claim 26, wherein incoming coolant from one end of said central passage is directed through said cavity past said heat exchangers to the other end of said central passage.

28. (New) An electric motor apparatus as recited in claim 25, wherein said cavity is in thermal communication with said air gap that separates said permanent magnets from said stator elements.

29. (New) An electric motor apparatus as recited in claim 28, wherein said hollow shaft has a plurality of cable apertures.

30. (New) An electric motor apparatus as recited in claim 29, wherein said cable apertures extend through said stator support structure to allow at least one cable to extend from said stator element to a position external to said hollow shaft.

31. (New) An electric motor apparatus as recited in claim 25, wherein said hollow shaft comprises a plug that directs at least some portion of coolant through said cavity from a first side of said plug to a second side of said plug.

32. (New) An electric motor apparatus as recited in claim 25, wherein said cavity is formed along an arc at a fixed radial distance from the hollow shaft in a direction parallel to the axis.

33. (New) An electric motor apparatus as recited in claim 12, wherein said hollow shaft comprises a plurality of cavities to secure said hollow shaft to a frame.

34. (New) An electric motor apparatus as recited in claim 12, wherein said hollow shaft is secured to a machine.

35. (New) An electric motor apparatus as recited in 34, wherein said machine is a vehicle.

36. (New) An electric motor apparatus as recited in claim 12, wherein a wheel is adapted to be secured to said rotor housing.

37. (New) An electric motor apparatus as recited in claim 36, wherein the wheel may be secured by a plurality of spokes.

38. (New) An electric motor apparatus as recited in claim 12, wherein said rotor housing rotates via a bearing arrangement located on each side of said stator elements in the axial direction.

39. (New) An electric motor apparatus as recited in claim 12, wherein the rotor housing comprises an annular ring shape.

40. (New) An electric motor apparatus as recited in claim 12, wherein coolant means passes through said central passage during motor operation.

41. (New) An electric motor apparatus as recited in claim 12, wherein the stator elements are ferromagnetically isolated from each other.

42. (New) An electric motor apparatus as recited in claim 12, wherein said plurality of stator elements are in communication with a power supply.

43. (New) An electric motor apparatus as recited in claim 12, wherein said plurality of stator elements are in communication with an electrical control unit.

44. (New) An electric motor apparatus as recited in claim 12, wherein a back iron is located between said permanent magnets and said rotor housing.

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45. (New) An electric motor apparatus as recited in claim 12, wherein said air gap is either radial or axial.